Becker discloses utilizing fluid flow in the form of field flow fractionation (FFF) combined with dielectrophoresis (DEP). Field flow fractionation requires a flowing non-stationary fluid in order to separate particles in suspension. FFF works by assuming there is a non-uniform flow profile in a chamber. This is typically a parabolic flow profile resulting from drag forces along the surface of the chamber, with maximum flow occurring in the center of the chamber (farthest from the chamber walls where friction and drag forces are their least), with flow being a minimum at the walls of the chamber (where friction and drag forces are at their maximum).

The principle of field flow fractionation is to utilize fluid flow and the fluid flow profile in conjunction with applying a secondary force perpendicular to the fluid flow. In Becker, the secondary force is dielectrophoresis. The application of the secondary force is intended to cause particles to preferentially move into different positions at differing heights within the chamber. Particles at differing heights will be positioned in a differing part of the fluid flow profile and therefore will flow at differing speeds.

Thus, applicants respectfully submit that the Examiner's statements in the last complete sentences of each of pages 3 and 5 of the official action and the first complete sentence of page 8 are in error. Becker does not teach use of a stationary fluid. Applicants refer the Examiner to page 15, lines 17-21 of Becker. Becker may choose to inject particles via the inlet port in batches or continuously. However, in order for Becker's system to work, there must be a flow of fluid through the chamber. This is secured by introducing fluid into the chamber via "ducts". There is no suggestion that fluid flow through the chamber is other than a necessary condition for the separation of different property particles from one another. Becker teaches and relies on a velocity profile in the fluid. A velocity profile is not present in a stationary fluid. Applicants' claimed invention is directed to a method for separating particles in a stationary fluid. Thus, the basic physics of operation which Becker teaches is different from that of applicants' claimed methodology and apparatus. Applicants' claimed invention requires suspension of particles in a stationary fluid.

Further in the claimed invention, a secondary signal is applied in a specific way that provides novel

results, namely the generation of a positive or negative cDEP force that results in extending or narrowing of the travelling wave dielectrophoresis (TWD) window. This allows either the characterization of cells over a wider TWD window and thus a wider range of cellular properties, or allows the making of particles to travel at vastly different speeds or in opposite directions, that would otherwise travel in the same direction at very similar speeds. This is used, therefore, in application for separation or easy detection of a specific particle type.

Being able to complete TWD over the full dielectrophoretic spectrum or narrow the TWD window for a specific particle is significant, especially extending the TWD window. An example is set forth in attached Figure 1. Figure 1 shows that for conventional TWD (cTWD) it is only possible to characterize and differentiate cells based on size and surface morphology. It is not possible to characterize or differentiate the cells based on their cytoplasm, and nucleus properties. The invention allows completion of TWD over the full dielectrophoretic spectrum and the ability to make particles travel at vastly different speeds or in opposite directions, thereby allowing characterization of biological particles over their full

ranges of cellular properties, i.e., size, surface morphology, cytoplasm and nucleus properties.

With reference to the claims, the above is implemented by applying the second signal at a second frequency which thus adds a secondary force to the particle. The net effect in this context is to either narrow or extend the TWD window, namely the frequency range, over which TWD can occur. The benefits obtained with respect to the TWD window are shown in attached Figures 1 , 2 and 3. The benefits obtained upon extending the TWD window is that essentially one can characterize and/or separate particles over the full dielectrophoretic spectrum if so desired (rather than just a narrow window of it). This is significant since cTWD (conventional non-superposition TWD) has a very limited application. The superposition TWD of the claimed invention can, therefore, achieve better selectivity and separation as compared to conventional TWD. The ability to make particles travel at vastly different speeds or in opposite directions, is either achieved by applying the second signal that results in narrowing the TWD window (by selectively applying a positive DEP force), or by applying the second signal that selectively applies a translational TWD force that results in the particles

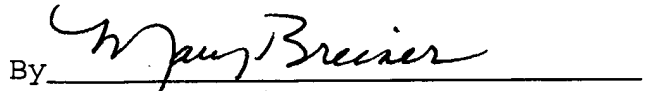
traveling at vastly different speeds or in opposite directions.

Accordingly, Becker does not teach each and every element as claimed by applicants. Thus, Becker does not anticipate the claimed invention under 35 U.S.C. §102. Further, Becker provides no suggestion to modify its own teaching so as to obtain applicants' claimed invention. Therefore, applicants respectfully submit that the claimed invention is not rendered obvious within the meaning of 35 U.S.C. §103. Withdrawal of the §102 rejection and the §103 rejection based on Becker is therefore respectfully requested.

Reconsideration and allowance of the claims are respectfully urged.

Respectfully submitted,

GARY LOCK ET AL

By 

Mary J. Breiner, Attorney
Registration No. 33,161
BREINER & BREINER, L.L.C.
P.O. Box 19290
Alexandria, Virginia 22320-0290

Telephone (703) 684-6885

Attachments - Figures 1, 2 and 3